AMENDMENTS TO THE CLAIMS

Please amend the claims as follows.

1. (Original) A method for allocating pilots and data to an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

i) partitioning subcarrier groups and symbols from the uplink channels based on a basic pilot pattern generated by a specific reference, and allocating at least one subchannel based on the partitioned subcarrier groups and the symbols;

ii) hopping the subcarrier groups according to a hopping pattern, and allocating data, the subcarrier groups being caused by the subchannel to allocated in step i); and

iii) differently allocating the pilot per subcarrier group based on the basic pilot pattern from the data hopped in step ii).

2. (Original) The method of claim 1, wherein the subcarrier groups are partitioned by a prime number.

3. (Currently Amended) The method of claim 1, wherein the subchannel allocated in step i) is allocated by at least one subcarrier group on the frequency axis, and by a unit of more than two symbols on the time axis.

4. (Currently Amended) The method of claim 1, wherein ~~the~~ step ~~of~~ ii) comprises using an RS code with the same length as that of the subchannel, and generating the ~~ho~~ hopping pattern.

5. (Currently Amended) The method of claim 4, wherein the RS code is allocated to the corresponding base station based ~~on the subsequent equation~~:

$rs_{cn}(b) = (rs(b)+gn*N+cn) \bmod Q)$

where b=0,1,...,Q-2, Q is a number of subcarrier groups, rs(b) is a basic RS code, rscn(b) is an RS code according to a cell number within a cell, gn is a group number, and on is a cell

number.

6. (Currently amended) The method of claim 1~~one of claims 1 to 5~~, wherein the hopping pattern follows ~~the subsequent equation~~:

$S_{hopping}(sn,b)=rs_{cn}((b+ off*\lfloor su/w \rfloor) \bmod Q)$

where Off is an offset value to the frequency domain for obtaining s frequency diversity when the subchannels are hopped for each unit of w symbols, sn is a number of symbols, Q is a number of subcarrier groups per symbol, and $rs_{cn}(b)$ is an RS code according to a cell number within a group.

7. (Currently Amended) The method of claim 1, wherein ~~the~~ step ~~of~~ iii) comprises:

a) partitioning the bandwidth of the uplink channel into a plurality of subcarrier groups having a specific number of subcarriers; and

b) allocating a pilot to each subcarrier group, wherein a basic pilot pattern with a different pilot position is generated to each subcarrier group.

8. (Original) The method of claim 7, wherein the pilot is allocated according to the subsequent equation, and the base station is distinguished based on the allocated pilot,

$F(gn,sn,cn,sgn)=(D(gn,sn)+ sgn*cn) \bmod N$

where sgn is a set of continuous adjacent carriers and it is a subcarrier group number, cn is a cell number, sn is a symbol number, gn is a group number, and D(gn,sn) is a function value according to gn and sn for generating the position of the pilot.

9. (Currently Amended) The method of claim 8, wherein the D(gn,sn) is found by the following ~~equations~~:

$D(gn,sn)=(gn+sn) \bmod N$ gn=0,1, …,N-1

$D(gn,sn)=(gn \bmod N+sn*1) \bmod N$ gn=N,N+1, …,2N-1

$D(gn,sn)=(gn \bmod N+sn*2) \bmod N$ gn=2N,2N+1,…, 3N-1

…

$D(gn,sn)=(gn \bmod N+sn*(N-1)) \bmod N$ gn=(N-1)*N,(N-1)*N+1, ...,N*N-1

where gn is a group number (gn=0,1,2,...,N*N-1), sn is a symbol number (sn=0,1, 2,...,S-1), cn is a cell number, and sgn is a subcarrier group number (sgn=0, 1,2,. . . ,Q-1)

10. (Original) A method for a transmitter to transmit pilot-inserted transmit data to a receiver through an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

a) receiving a specific subcarrier group and a subchannel of a specific symbol unit by a specific reference, hopping the specific subcarrier group according to a specific hopping pattern to allocate data, and allocating pilots based on a specific pilot pattern from the allocated data;

b) transmitting information according to the allocated data and pilots; and

c) transmitting the pilot-inserted transmit data to the receiver.

11. (Currently Amended) The method of claim 10, wherein ~~the~~ step ~~of~~ a) comprises receiving a subcarrier group and a subchannel with more than two continuous symbols.

12. (Currently Amended) The method of claim 10, wherein ~~the~~ step ~~of~~ b) comprises:

d) converting the data and the pilots into respective parallel signals according to the data to be transmitted and the number of pilot subcarriers;

e) respectively modulating the parallel data and signals converted in step d); and

f) receiving the data and the pilot modulated in step e), performing an IFFT as (inverse fast Fourier transform) on the pilot-inserted data based on the data and the pilots allocated in step a), and converting them into time domain signals.

13. (Currently Amended) The method of claim 12, wherein ~~the~~ step ~~of~~ c) comprises:

adding a cyclic prefix to the time domain signals converted in step f), and converting them into serial signals; and

converting the serial signals into analog signals, filtering the analog signals, and transmitting the filtered signals to the receiver.

14. (Original) The method of claim 10, wherein the hopping pattern is generated by using an RS code having the same length as that of a subchannel.

15. (Currently Amended) A method for receiving pilot-inserted data from a transmitter through an uplink channel in an OFDMA (orthogonal frequency division multiple to access) system, comprising:

a) converting the data transmitted by the transmitter into frequency domain signals;

b) reversely hopping the frequency domain signals converted in step a) based on information on the data and the pilot transmitted by the transmitter, wherein the information follows the data allocated by hopping a specific subcarrier group from among the subcarrier groups partitioned based on a specific basic pilot pattern and follows the pilot allocated from the allocated data based on the specific pilot pattern; and

c) demodulating the reversely hopped data, and receiving them.

16. (Currently Amended) The method of claim 15, wherein ~~the~~ step ~~of~~ a) comprises:

d) filtering the data transmitted by the transmitter, and converting the filtered data into digital signals;

e) eliminating a cyclic prefix of the digital signal, and converting them into parallel signals; and

f) performing an FFT (fast Fourier transform) on the parallel signals and converting them into frequency domain signals.

17. (Currently Amended) The method of claim 15, wherein ~~the~~ step ~~of~~ b) comprises:

g) detecting positions of the data and the pilots based on the information of the data and the pilots;

h) reversely hopping the detected data; and

i) separating the reversely hopped data and pilots based on the positions of the data and the pilots detected in step g).

18. (Currently Amended) The method of claim 17, wherein ~~the~~ step ~~of~~ c) comprises:

j) estimating a channel on the frequency axis based on the position of the pilot; and

k) using the channel estimate in step j), and demodulating and receiving the data.

19. (Currently Amended) The method of claim 18, wherein ~~the~~ step ~~of~~ j) comprises:

performing channel estimation from a specific subcarrier based on the position of the pilot, and estimating the frequency axis channel by interpolation using the channel estimate.

20. (Original) A transmitter for transmitting pilot-inserted transmit data to a receiver through an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

a serial/parallel converter for converting data and pilots into parallel go signals according to number of pilots and data subcarriers;

a modulator for modulating the parallel data and pilots converted by the serial/parallel converter;

a hopping pattern controller for receiving a specific subcarrier group and a subchannel of a specific symbol unit by a specific reference, hopping the specific subcarrier group according to a specific hopping pattern to allocate data, allocating pilots based on a specific pilot pattern from the allocated data, and transmitting information caused by the allocated data and pilots to the receiver, wherein the hopping pattern is generated by using an RS code which corresponds to a length of the subchannel;

a multiplexer for inserting pilots into the data based on the allocated data and the pilots, and multiplexing them;

an IFFT (inverse fast Fourier transform) unit for converting the multiplexed frequency domain signals into time domain signals, and outputting the same;

a parallel/serial converter for adding a cyclic prefix to the signals output to by the IFFT unit, and converting them into serial signals; and

a digital/analog converter and filter for converting the serial signals output by the parallel/serial converter into analog signals, filtering them, and transmitting the filtered signals to the receiver through an RF (radio frequency) terminal.

21. (Original) The transmitter of claim 20, wherein the pilots are allocated to have different positions within the subcarrier group.

22. (Original) The transmitter of claim 20, wherein the corresponding base station is distinguished based on the hopping pattern and the pilot pattern.

23. (Original) A receiver for receiving pilot-inserted transmit data from a transmitter through an uplink channel in an OFDMA (orthogonal frequency division multiple access) system, comprising:

an A/D (analog/digital) converter and filter for converting the data transmitted by the transmitter into digital signals;

a serial/parallel converter for eliminating a cyclic prefix from the digital signals, and converting them into parallel signals;

an FFT (fast Fourier transform) unit for performing an FFT on the parallel signals, and outputting frequency domain signals;

a hopping pattern controller for receiving information on the data and the pilots transmitted by the transmitter, detecting positions of the data and pilots from the frequency domain signals output through the FFT unit, and reversely hopping the data from the detected positions of the data, wherein the information follows the data allocated by hopping a specific subcarrier group from among the subcarrier groups partitioned based on a specific basic pilot pattern and follows the pilot allocated from the allocated data based on the specific pilot pattern;

a demultiplexer for separating the reversely hopped data and pilots based on the positions of the detected data and pilots;

a channel estimator for using the separated pilots and estimating a channel of the separated data;

a demodulator for using the estimated channel estimate and demodulating the separated data; and

a parallel/serial converter for converting the demodulated parallel data into serial data.